Cumulative Index 1988

Volume 8

March	CLASSIFICATION, DIAGNOSIS, AND MOLECULAR BIOLOGY OF LYMPHOPROLIFERATIVE DISORDERS, pages 1–252
June	AUTOIMMUNE DISEASES: CLINICAL CONSIDERATIONS AND LABORATORY TESTING, pages 253–414
September	URINALYSIS, pages 415–622
December	PERSPECTIVES ON CLINICAL LABORATORY AUTOMATION, pages 623–792

Note: Page numbers of article titles are in **boldface** type.

ABBOTT MS–2 microbiology analyzer, 644
N-Acetyl-beta-D-glucosaminidase, in renal function assessment, 501, 514–515
Acid-labile interferon alpha, in HIV infection, 273
Acquired immune deficiency syndrome (AIDS). See also *Human immunodeficiency virus.*
  diagnosis of, surface markers in, 241
  Epstein-Barr virus and, 106–108
  lymphoma development in, 108
Acute interstitial nephritis, urinalysis in, by monoclonal antibody technique, 490
  by transmission electron microscopy, 477, 479
Acute renal failure, urinalysis in, 508. See also *Urinalysis, in renal function assessment.*
Acute tubular necrosis, urinalysis in, 517–518. See also *Urinalysis, in renal function assessment.*
  by monoclonal antibody technique, 490
  by transmission electron microscopy, 464–468
Addison's disease, HLA antigens and, 361
Adenosine deaminase-binding protein, in renal function assessment, 501–502, 516–522
Adrenal hormones, immune system effects of, 264–265
"Agar slant" microbiology analyzer, 646
Agglutination assays, in microbiology, 649
AIDS. See *Acquired immune deficiency syndrome.*
L-Alanine aminopeptidase, in renal function assessment, 514
Albuminuria, normal levels of, 528
  urinalysis in, **611–616**
Alkaline phosphatase anti-alkaline phosphatase (APAAP) method, **223–236**
  fixation methods for, 225–226
  in acute lymphocytic leukemia, 228
  in acute myeloid leukemia, 228–229
  in chronic lymphoid leukemia, 228
  in chronic myelogenous leukemia in blastic transformation, 229–230
  in hairy-cell leukemia, 228
  in Hodgkin's disease, 233
  in mixed myeloid/lymphoid leukemia, 230
  in non-Hodgkin's lymphoma, 230–233
  interpretation of results from, 226–228
  principle of, 224
  purpose of, 224
  specimens for, 225
  stains for, 226
Allergic encephalitis, experimental, HLA antigens and, 366–367
Allergic neuritis, experimental, HLA antigens and, 366–367

Allophycocyanin, in flow cytometry of urine, 545
Alopecia areata, HLA antigens and, 359
Alpha gliadin, in gluten-sensitive enteropathy, 355
Alpha-interferon, in hairy-cell leukemia, 189
Alpha-naphthyl acetate esterase activity, in hairy-cell leukemia, 184
Alpha-naphthyl butyrate esterase activity, in hairy-cell leukemia, 184
Aminoglycoside nephrotoxicity, urinalysis in, 509, 511–512, 518
  by transmission electron microscopy, 468, 476–477
Analyzers, chemistry. See *Chemistry analyzers, automatic.*
Anatomic pathology, image analysis in, 734–735
Anemia, hemolytic, lymphoid malignancy and, 375–377
  HLA antigens and, 362–363
  in HIV infection, 275
Angioimmunoblastic lymphadenopathy, 141–142
  autoimmunity and, 374
Ankylosing spondylitis, HLA antigens and, 355
Anti-idiotypes, autoimmune disease and, **399–406**
Anti-lymphocyte antibodies, in HIV infection, 273
Anti-red blood cell antibodies, in HIV infection, 272–273
Antibodies. See also *Autoantibodies*; specific type.
  in renal diagnostic studies, 515–522
  in urine sediment analysis, 483–491
  production of, immune complexes and, in autoimmune disease, **337–349**
Antibody-coated bacterial assay, in urinary tract infection, 572–573
Antibrain antibodies, in schizophrenia, 254–255, 258
Anticardiolipin, in HIV infection, 272
Anticellular antibodies, in HIV infection, 272–273
Anticolon antibodies, in inflammatory bowel disease, 328
Antigens, associated with Epstein-Barr virus, 98
  B cell activation by, 25
  in flow cytometry of urine, 543
  specificity of, 32–33
Antimitochondrial antibodies, in primary biliary cirrhosis, 292–294
Antimucosal antibodies, in inflammatory bowel disease, 328–330
Antinuclear antibodies, in chronic active hepatitis, 285–286
  in HIV infection, 271
Antiplatelet antibodies, in HIV infection, 272
Antithymocyte globulin therapy, urinalysis in, 519–520
Anuria, in renal function assessment, 494
APAAP method. See *Alkaline phosphatase anti-alkaline phosphatase method.*
Arteritis, lymphoid malignancy and, 380–381
Arthritis. See also *Rheumatoid arthritis.*
  collagen-induced, stress effects on, 261
  lymphoid malignancy and, 380–381
  postinfectious, HLA antigens and, 365
Arthus reaction, in inflammatory bowel disease, 326
Artificial intelligence. See *Knowledge-based automation.*
Ataxia/telangiectasia, Epstein-Barr virus and, 108, 111
AUTOBAC microbiology analyzer, 644
AU5000 chemistry analyzer, 641
Autoantibodies, in HIV infection, 271–272
  liver-kidney-microsomal, 286–289
  production of, anti-idiotype role in, 404
  soluble cytoplasmic liver antigen, in chronic active hepatitis, 290–291
  thyrotropin receptor protein. See *Thyrotropin receptor protein autoantibodies.*
Autogrouper blood typing instruments, 677
Autoimmune disease, anti-idiotypes and, **399–406**
  central nervous system manifestations of, **253–268**
  clinical considerations in, **253–414**
  etiology of, 399
  Graves' disease, thyrotropin receptor protein antibodies in, **303–323**
  HIV infection and, **269–279**
  HLA histocompatibility system in, **351–372**
  immune complex formation in, **337–349**
  in lymphoid malignancy, **373–398**
  inflammatory bowel disease, **325–336**
  laboratory testing in, **253–414**
  of liver, **281–301**
  otologic, **385–398**
Autologous blood salvage, equipment for, 681–685
Automated Intelligent Microscopy, in urinalysis, 746–747
Automation. See also *Robotics.*
  hematology analyzers in, **653–673**
    evaluation of, 667–668
    methods used by, 653–664
    new parameters measured by, 665–667
    user acceptance of, 668–670
  image analysis in. See *Image analysis.*
  in blood banking/hemotherapy, **675–687**
    in autologous blood salvage, 681–685
    in immunohematology, 675–681

Platelet Monitor System in, 685–686
Sterile Connection Device in, 686
in microbiology, **643–651**
in routine chemical analysis, **633–642**
history of, 633–634
instrument systems for, 635–641
operating cycles of instruments and, 634–635
random access analyzer, 634
in STAT analyses. See *STAT analyses, automated.*
instrument selection for, **759–774**
assessment of need in, 762–764
errors in, 772–774
features versus requirements of instrument in, 770–771
implementation of new instrument and, 774
overbuying and, 772–773
reagent limitations and, 773–774
sales pitches involving, 789–790
technologic aspects of, 760–762
workflow analysis in. See *Workflow analysis.*
instrumentation technologies for, **623–632**, 760–762
microprocessors, 623–624
optical systems, 624–626
reagent handling mechanisms, 627–631
reagent systems, 626–627
sample handling mechanisms, 627–631
knowledge-based, **713–722**
of clinical laboratory, **623–774**
workflow analysis for. See *Workflow analysis.*
AUTOSCAN microbiology analyzer, 644
Azotemia, urinalysis in. See *Urinalysis, in renal function assessment.*

B cells, activation of, by antigen, 25
versus malignant B-cell activation, 165–166
development of, versus malignant B-cell development, 163–164
differentiation of, **15–30**
pre-B cells in, 16–22
disorders of, versus hairy-cell leukemia, 188–189
identification of, **15–30**
techniques for, 22–23
life history of, 15–16. See also *Plasma cells; Pre-B cells.*
maturation of, 22–23
neoplasms of. See also *Leukemia; Lymphoma.*
comparison of, with normal B cells, in activation, 165–166
in development, 163–164
in proliferation, 165–166
cytogenetics of, 168
cytoskeleton abnormalities in, 164–165
differentiation capacity in, 166–168
immunobiology of, **163–195**
immunoglobulin gene rearrangements in, **45–64**
heavy chain class switching in, 52
heavy chain gene configuration in, 47
incompletely assembled variable region gene expression in, 52
insertional diversification in, 53
light chain gene configuration in, 47–48
mechanisms of, 48–52
somatic mutation in, 53
membrane abnormalities in, 164–165
natural killer cells in, 171–172
T cells in, 168–169
T helper cells in, 170
T suppressor cells in, 170–171
terminally differentiated, **197–210**
proliferation of, versus malignant B-cell proliferation, 165–166
transformation of, by Epstein-Barr virus, 100–101
Bac-T-Screen microbiology analyzer, 645
Bactec microbiology analyzer, 644–645
Bacteria, antibody-coated, in urinary tract infection diagnosis, 572–573
Bacteriuria. See *Urinary tract infections.*
Baker System 9000 hematology analyzer, 657
Balkan nephropathy, urinalysis in, 511
Bar codes, in sample identification, 630–631
Beckman Biomek Pipetting Station, 700–701
Behçet's disease, otologic involvement in, 391
Beta$_2$-microglobulin, in renal function assessment, 501, 510–513
Biliary cirrhosis, primary, 292–295
HLA antigens and, 362
Bio-Image Visage system, 733–734
Biomek Pipetting Station, 701–702
Biosensors, in automated instrumentation, 626
Biovation Digital Urinometer, 452
Biovation Urinalysis Control, 454
Biuret method, in proteinuria, 534–535
Bladder cancer diagnosis, flow cytometry of urine in, 547–551
Bladder infection, localization of, by urinalysis, 570–571
Blood, in urine. See *Hematuria.*
Blood banking, automation in, **675–687**
in autologous salvage, 681–685
in high-volume blood center, 675–678
in transfusion services, 678–681
Platelet Monitoring System, 685–686
Sterile Connection Device, 686

Blood disorders, HLA antigens and, 362–363
Blood salvage, equipment for, 681–685
Bone marrow, disorders of, cytochemistry in, 218, 220–221
examination of, in hairy-cell leukemia diagnosis, 181
pre-B cells in, 18
lymphocytosis in, surface markers in, 242
T-cell neoplasms of, of post-thymic differentiation, 139–140
Bourdon tube, for liquid handling, 628
Brachial neuritis, in HIV infection, 276
Brush border enzymes, in renal function assessment, 513–514
Burkitt's lymphoma, 111–112
chromosomal translocations in, 39

Campylobacter infection, arthritis after, HLA antigens and, 365
Cancer. See also *Malignancy.*
detection of, nuclear magnetic resonance in, 750
Candida albicans infection, stress effects on, 260–261
Carrageenin, inflammatory bowel disease and, 329
Carryover of specimen, control of, 628–629
CAS image analysis system, 735
CD antibodies, T-cell reactive, 1–5
CD3/Ti complex, role of, 6–7
Celiac disease, HLA antigens and, 361
Cell analysis, image analysis in, 734–735
Cell-Dyn hematology analyzer, 657
Cellect hematology analyzer, 657
Cellsoft semen analyzer, 730–731
Cellular casts, in urinalysis, 487–490
Central nervous system, autoimmune disease and, **253–268**
schizophrenia as, 254–259
stress effects on, 259–265
Centrifugation, in automated STAT analysis, 692
in urinalysis, 443–444
Chem 1 chemistry analyzer, 635, 638
Chemical analysis, in urinalysis, 440–442
Chemistry analyzers, automatic, **623–632, 633–642**
AU5000, 641
Chem 1, 635, 638
Ektachem, 638–639
history of, 633–634
Hitachi, 639–640
in STAT analysis, 692–697
ion-selective electrode cycle of, 634–635
microprocessors in, 623–624
operating cycles of, 634–635
optical systems for, 624–626
Paramax, 640–641
random access type, 634–635, 638–641, 696–697
reagent handling in, 627–631
reagent systems for, 626–627
sample handling in, 627–631
types of, 635–641
unattended operation of, 635
workflow analysis and. See *Workflow analysis.*
Chemotherapeutic agents, nephrotoxicity of, urinalysis in, 509, 518
Chemotherapy, in acute lymphoblastic leukemia, 129–131
in acute lymphoblastic lymphoma, 130–131
Children, asymptomatic bacteriuria in, 568
Chloride, in urinalysis, in renal function assessment, 496–497
Chloroacetate esterase, in bone marrow disorders, 218
Chromosomal translocation, immunoglobulin gene rearrangements and, 59–60
in Burkitt's lymphoma, 39
Chromosome analysis, automated, 731–732
Chronic active hepatitis. See under *Liver, autoimmune disease of.*
Chronic lymphocytic leukemia, autoimmune disease and, 376–378
Cirrhosis, primary biliary, 292–295
HLA antigens and, 362
Clarity of urine, in urinalysis, 438
Clinitek instruments, in urinalysis, 454–455
COBE blood salvage processor, 684–685
Codes for specimen handling. See *Bar codes.*
Cogan's syndrome, otologic involvement in, 390–391
Colitis, ulcerative. See also *Inflammatory bowel disease.*
otologic involvement in, 391
Collagen, Type II, immune reactivity to, in hearing loss, 394–395
Color of urine, in urinalysis, 438
Colorimetric methods, in urinalysis, in proteinuria, 534–535
Complement system activation, in inflammatory bowel disease, 330–331
in primary biliary cirrhosis, 292
Computers, in automated instrumentation, 623–624. See also *Bar codes; Knowledge-based automation; Robotics.*
in image analysis, 743–744
Cost accounting, in urinalysis, 587–589
Coulter counters, 653–655
Creatinine clearance, in renal function assessment, 502
Creatinine ratios, in urinalysis, in renal function assessment, 496

Crohn's disease. See also *Inflammatory bowel disease.*
stress effects on, 259
Cryoglobulin assay, in hearing loss, 395
Cryptitis, in inflammatory bowel disease, 326
Cyclic AMP measurement, in Graves' disease, 305–308
Cyclosporine nephrotoxicity, urinalysis in, 511–512, 518–521
Cytochemistry, in lymphoproliferative disorders, **211–222**
bone marrow lesions, 218, 220–221
hairy-cell leukemia rule-out, 220–221
histiocytic infiltrate, 216, 218
histiocytic lymphoma, 216
Hodgkin's disease, 214–215
leukemia, lymphoid versus nonlymphoid, 219
lymph node architecture in, 213
lymphoid pseudotumor, 216
lymphoma, 213–214
versus lymphoid pseudotumor, 216
versus seminoma, 216
with limited biopsy material, 218
lymphoma rule-out, 214
malignant histiocytes, 216
multiple myeloma, 220
non-Hodgkin's lymphoma, pleomorphic, 214–215
plasmacytosis, 220
poorly differentiated malignancy, 214
rate of proliferation in, 218
testicular mass, 216
Cytogenetics, image analysis in, 731–734
Cytology, image analysis in, 734–735
in urinalysis. See *Flow cytometry*; *Sediment evaluation.*
Cytopenia, in hairy-cell leukemia, 180
Cytoplasmic liver antigen autoantibodies, in chronic active hepatitis, 290–291
Cytotoxic activity, in chronic active hepatitis, 284–285
in inflammatory bowel disease, 332

D-Tran RT–3000S robot, 706
2′-Deoxycorformycin, in hairy-cell leukemia, 189–190
Dermatitis herpetiformis, HLA antigens and, 359
Dermatomyositis, HLA antigens and, 358
lymphoid malignancy and, 374, 379–380
Dermatosis, surface markers in, 241–242
Diabetes mellitus, HLA antigens and, 359–360
metabolic studies in, nuclear magnetic resonance in, 749
microalbuminuria in, **611–616**
stress effects on, 259
Dipstick testing, in urinalysis, 440–442, 592–593
automated, 454–455
in microscopic hematuria, 603
in proteinuria, 533–534
Direct immunofluorescence assay, in microbiology, 648
DNA, in cell nuclei, image analysis of, 734–735
DNA analysis in urine, flow cytometry in, 543, 548
DNA probes, in microbiology, 647–648
Drugs, acute interstitial nephritis induced by, eosinophiluria in, 555–556, 562–564
disease induced by, HLA antigens and, 366
renal toxicity from. See *Nephrotoxicity.*

E rosettes, in acute lymphoblastic leukemia prognosis, 128–129
Ear, disease of. See *Otologic disease.*
immunology of, 385–388
Ektachem analyzers, 638–639
in STAT analysis, 693–694
Elderly patients, asymptomatic bacteriuria in, 568–569
Electric shock, immune system effects of, 261–264
Electrophoresis, image analysis in, 732–734
Encephalitis, experimental allergic, HLA antigens and, 366–367
Endocrine disease, HLA antigens and, 359–361, 364
Endorphins, immune system effects of, 264–265
Enzyme immunoassay, in microbiology, 648–649
Enzymes, activity of, determination of, flow cytometry of urine in, 543
in renal function assessment, 513–515
Eosinophiluria, clinical spectrum of, 555–556, 561–562
in drug-induced acute interstitial nephritis, 555–556, 562–564
screening for, 556
urinalysis in, **555–564**
Epithelial cells, in urinalysis, 488
Epstein-Barr virus, **97–118**
AIDS and, 106–108
antigens associated with, 98
cell transformation by, 100–101
cellular immunity in, 104
chronic manifestations of, 112–113
chronic mononucleosis and, 112–113
cytopathic effect of, 99–100
hereditary immunodeficiency and, 108–111
humoral response to, 103–104
immunologic responses to, 103

Epstein-Barr virus *(Continued)*
in rheumatoid arthritis pathophysiology, 113
infectious mononucleosis and, 103–106
in hereditary immunodeficiency, 108–109
lymphoma and, 108–109, 111–112
molecular biology of, 101–102
organ transplantation and, 107
replication of, 99
structure of, 97–98
Escherichia coli in urine, determination of, by flow cytometry, 546–547
ESPRE knowledge-based system, 718
Exophthalmos, thyrotropin receptor antibody levels in, 318
EXPERT Consultation System, 718
Expert systems, in automation. See under *Knowledge-based automation.*
550 Express analyzer, in STAT analysis, 692–693

Fast 4 analyzer, in STAT analysis, 692–693
Fiber optics, in automated instrumentation, 625
Flow cytometry, in urinalysis, **541–553**
cell sorting in, 544
immunologic, 544–547
oncologic, 547–551
parameters analyzed by, 543
principles of, 541–544
surface marker analysis in, 544
Folin-Lowry method, in proteinuria, 534–535
Free water clearance, in urinalysis, in renal function assessment, 498–499
FRTL–5 cell bioassay, in Graves' disease, 307–308

Gamma Biologicals STS blood typing instruments, 679
Gammaglobulin levels, in HIV infection, 270–271
Gastroenterologic disease, HLA antigens and, 361–362
Genes, deletions of, in pre-B cell formation, 20–22
of Epstein-Barr virus, 101–102
rearrangements of, in acute lymphoblastic leukemia, 157–158
in B-cell neoplasms, **45–64**
heavy chain class switching in, 52
heavy chain configuration in, 47
incompletely assembled variable region gene expression in, 52
insertional diversification in, 53
light chain configuration in, 47–48
mechanisms of, 48–52
somatic mutation in, 53
in pre-B cell formation, 19–20
in T-cell neoplasms, **31–44**
translocation of, in lymphoma, 111–112
Genetic aspects, of human lymphocyte antigen, 353–354
Genetic markers, in acute lymphoblastic leukemia, 123
Genetiscan Digital Karyotype System, 731–732
Gentamicin nephrotoxicity, urinalysis in, 518
Gibco Sensititer, 645
Glomerular disease, urinalysis in, by monoclonal antibody technique, 490
transmission electron microscopy in, 477
Glomerular filtration rate, creatinine clearance and, 502
Glomerular proteinuria, clinical significance of, 536
mechanisms of, 529–532
Glomerulonephritis, in HIV infection, 276
Gluten-sensitive enteropathy, alpha gliadin in, 355
Gold-induced proteinuria, HLA antigens and, 366
Granulocytes, in urinalysis, 487
Granulocytopenia, lymphoid malignancy and, 377–378
Granuloma, in primary biliary cirrhosis, 292
Granulomatosis, Wegener's, otologic involvement in, 390
Graves' disease. See also *Thyrotropin receptor protein autoantibodies.*
historical perspectives of, 304–305
HLA antigens and, 360–361
Groupamatic blood typing instruments, 677–678

Haemonetics HaemoLite autologous transfusion device, 683
Hairy-cell leukemia. See under *Leukemia.*
autoimmune disease and, 381
Hansel's stain, for eosinophiluria analysis, 557, 560–564
Hashimoto's thyroiditis, HLA antigens and, 361
Hearing loss, sensorineural, autoimmunity and, 391–393
tests for, 394–395
Heart transplantation, autoantibodies confused with anti-HLA antibodies in, 369–370
Heavy metal poisoning, urinalysis in, 511
HELP knowledge-based system, 719

Hematology analyzers, automated, **653–673**
Coulter counters, 653–655
electric impedance principle in, 653–657
electro-optical (light scattering) principle in, 657–663
erroneous results from, 663
evaluation of, 667–668
hemoglobin distribution width measurement by, 667
image analysis in, 726–728
mean platelet volume determined by, 666
methods used by, 653–664
new parameters measured by, 665–667
peroxidase indicators in, 667
platelet distribution width measurement by, 667
red cell distribution width measurement with, 665–666
Technicon instruments, 657–663
user acceptance of, 668–670
HEMATRAK analyzer, 727–728
Hematuria, causes of, 577–578
diagnostic algorithm for, in adults, 578–581
in children, 581–583
microscopic, diagnosis of, 606–608
direct examination in, 601–603
etiology of, 604–606
in asymptomatic patients, 607–608
prevalence of, 603–604
urinalysis in, **601–610**
urine dipstick testing in, 603
urinalysis in, **577–584**, **601–610**
Hemoglobin distribution width, measurement of, 667
Hemolytic anemia, HLA antigens and, 363
lymphoid malignancy and, 375–377
Hemotherapy. See *Blood banking.*
Hepatitis, chronic active. See under *Liver, autoimmune disease of.*
Hepatorenal syndrome, urinary sediment evaluation in, transmission electron microscopy in, 477
Hereditary immunodeficiency, Epstein-Barr virus and, 108–111
Histiocytic neoplasia, immunoglobulin gene rearrangements in, 56–57
Histiocytosis, malignant, cytochemistry in, 216
versus T-cell neoplasms, 139
regressing atypical, 137, 139
Histiocytosis X, cytochemistry in, 216, 218
Hitachi chemistry analyzers, 639–640
HIV. See *Human immunodeficiency virus.*
HLA. See *Human lymphocyte antigen.*
Hodgkin's disease, APAAP method in, 233
autoimmune disease and, 375–376, 379–380
cytochemistry in, 214–215
Epstein-Barr virus and, 112
gene rearrangements in, 36, 57
versus T-cell lymphoma, 146
Hormones, immune system effects of, 264–265
Human immunodeficiency virus, autoimmune manifestations of, **269–279**
clinical syndromes of, 274–276
laboratory phenomena in, 270–273
mechanisms of, 269–270
Human lymphocyte antigen (HLA), in autoimmune disease, **351–372**
Addison's disease, 361
dermatologic, 359
diabetes mellitus, 359–360
drug-induced, 366
gastroenterologic, 361–362
genetics of, 353–354
hematologic, 362–363
induced expression of, 366–367
mechanisms of, 355
multiple sclerosis, 363
myasthenia gravis, 363–364
of liver, 362
of thyroid, 360–361
ophthalmologic, 364
overview of, 351–353
polymyositis, 358
relative risk in, 355
restriction fragment length polymorphism of, 367–369
rheumatologic, 364–365
schizophrenia, 258–259
Sjögren's syndrome, 358
systemic lupus erythematosus, 357–358
transplantation crossmatching and, 369–370
Human T-cell leukemia/lymphoma virus (HTLV)-I, **65–84**
adult T-cell leukemia and, 69–70, 72–75
as cause of lymphoproliferative disorders, 77–79
discovery of, 67–69
lymphoma related to, 145–146
molecular characterization of, 70–72
replication of, 91–93
seroepidemiology of, 75–77
T-cell transformation by, 90–91, 93
versus HTLV-II, 87
viral classification of, 65–67
Human T-cell leukemia/lymphoma virus (HTLV)-II, **85–95**
discovery of, 85
identification of, in clinical samples, 88
molecular, 89–90
isolation of, from leukemia patients, 85–87
lymphoproliferative disorders and, **85–95**
regional seropositivity of, 87
replication of, 91–93

Human T-cell leukemia/lymphoma virus (HTLV)-II *(Continued)*
T-cell transformation by, 90–91, 93
tartrate-resistant acid phosphatase-positive cells and, 85–86
versus HTLV-I, 87
Human T-lymphotrophic virus III. See *Human immunodeficiency virus.*
Hydralazine-induced lupus erythematosus, HLA antigens and, 366
Hypergammaglobulinemia, in HIV infection, 270–271
Hypersensitivity, drug, acute interstitial nephritis in, 555–556, 562–564
Hyperthyroidism, neonatal, prediction of, 318
tests for, 317–318. See also *Thyrotropin receptor protein autoantibodies.*

Idiotypy, in autoimmune disease, functional, 401–402
physical, 399–401
public versus private, 401
Image analysis, in automation, **723–736**
analog, principles of, 724
digital, principles of, 724–725
editing of image in, 725
in anatomic pathology, 734–735
in cytogenetics, 731–734
in hematology, 726–728
in semen analysis, 729–730
in urinalysis, 728–729
instrument components for, 725–726
methods of, 723–724
Immucor, Inc., blood typing instrument, 680
Immune complex, assay of, in hearing loss, 395
formation of, in autoimmune disease, **337–349**
in HIV infection, 271
in inflammatory bowel disease, 330
in primary biliary cirrhosis, 292
Immune response, cellular, in inflammatory bowel disease, 331
Immune system. See also *Autoimmune disease.*
effects of stress on, 259–265
Immunity, Epstein-Barr virus and, 103–105
Immunoassays, in microbiology, 648–649
Immunoblastic lymphadenopathy, 141–142
autoimmunity and, 374
Immunoblot techniques, in liver-kidney-microsomal autoantibody determination, 287
Immunocytochemistry, in lymphoproliferative disorders, **211–222**
Immunodeficiency, acquired. See *Acquired immune deficiency syndrome.*
hereditary, Epstein-Barr virus and, 108–111
Immunofluorescence assay, in microbiology, 648
of antinuclear antibodies, 285
of B cells, 22–23
of liver-kidney-microsomal autoantibodies, 287
of pre-B cells, 18
Immunofluorescence flow cytometry, in urinalysis, 544–545
Immunoglobulins, gene rearrangements in, in acute lymphoblastic leukemia, 157–158
in B-cell neoplasms, **45–64**
chromosomal translocations and, 59–60
clonality assessment in, 57–59
heavy chain class switching in, 52
heavy chain gene configuration in, 47
incompletely assembled variable region gene expression in, 52
insertional diversification in, 53
light chain gene configuration in, 47–48
lineage assignment in, 53–57
mechanisms of, 48–52
methodology for, 53
minimal residual disease detection by, 59
somatic mutation in, 53
in leukemia, methodology for, 53
in B cells, 20–25
in HIV infection, 270–271
in lamina propria, in inflammatory bowel disease, 327–328
in primary biliary cirrhosis, 292
in urine, 528
Immunohematology, automated, in high-volume blood center, 675–678
in transfusion services, 678–681
Immunohistology, of B cells, 22–23
Immunologic methods, in urinalysis, 483–491
in microalbuminuria, 615
in proteinuria, 535
in renal diagnostic studies, 515–522
in urinary tract infection, 572–573
Immunoperoxidase staining, in microbiology, 649–650
in urinalysis, 485–486
Immunophenotyping, in acute lymphoblastic leukemia, **151–162**
classification of, 152–157
differential, 152–157
gene rearrangements, correlation with, 157–158
in adulthood, 156–157
in childhood, 153–156
karyotypic abnormalities, correlation with, 158–159
methodology of, 151–152

Immunoregulatory cells, in chronic lymphocytic leukemia, **163–195**
Immunosuppressive therapy, Epstein-Barr viral infections and, 107–108
in chronic active hepatitis, 282–283
nephrotoxicity of, urinalysis in, 509, 518–521
thyrotropin receptor antibody levels and, 317
Infections, urinary tract. See *Urinary tract infections.*
Infectious mononucleosis, Epstein-Barr virus and, 103–106
in hereditary immunodeficiency, 108–109
Inflammatory bowel disease, HLA antigens and, 361–362
immune responses in, **325–336**
antimucosal antibodies, 328–330
cellular, 331
inflammatory mediators and, 330–331
local antibody production, 327–328
natural killer cells activity, 332
types of, 325–326
microorganisms and, 325
Information systems, knowledge-based systems in, 719
Instrumentation. See also *Automation; Chemistry analyzers, automatic; Hematology analyzers, automated.*
workflow analysis for. See *Workflow analysis.*
Interferon, acid-labile, in HIV infection, 273
in hairy-cell leukemia, 189
in lymphoid malignancy, adverse effects of, 381–382
Interleukin–2, production of, in schizophrenia, 257
Interleukin–2 receptors, in schizophrenia, 255–257
Intraoperative autologous transfusion devices, high-speed, 682–683
Iodine–125-labeled thyroid stimulating hormone, preparation of, 310
Iodine–131 therapy, thyrotropin receptor antibody levels and, 317–318
Isolator microbiology analyzer, 645
Isotype switching, in pre-B cell formation, 20–22

Jerne immune network theory, 401–402

Karyotypic abnormalities, in acute lymphoblastic leukemia, 158–159
Karyotyping, image analysis in, 731–732
Keratitis, interstitial, in autoimmune disease, 390–391
Kidney, dysfunction of, eosinophiluria in, 561–562
in diabetes, microalbuminuria in, 611–616
in drug-induced acute interstitial nephritis, 555–556, 562–564
failure of, urinalysis in, 508. See also *Urinalysis, in renal function assessment.*
function of, assessment of. See under *Urinalysis.*
toxic effects on. See *Nephrotoxicity.*
transplantation of, urinalysis in, 509, 518–521
transmission electron microscopy in, 477
Killer cells. See also *Natural killer cells.*
in inflammatory bowel disease, 332
Knobby nuclei, in chronic lymphocytic leukemia, 140
Knowledge-based automation, **713–722**
artificial intelligence and, 714–715
expert systems and, 715–720
development tools for, 717
future role of, 719–720
inference engine in, 716
knowledge engineering in, 716–717
practical applications of, 717–719
problem selection in, 716–717
structure of, 715–716
Kyoto Urine Analyzer, 454

Laboratory automation. See *Automation.*
Lactic acidosis, nuclear magnetic resonance studies in, 750
Lactic dehydrogenase, in urinalysis, in renal function assessment, 499
Lamina propria cells, in inflammatory bowel disease, 327–328
LATS (long-acting thyroid stimulator), 304
Lennert's lymphoepithelioid cell lymphoma, 142–144
Leukemia, acute lymphoblastic, immunoglobulin gene rearrangements in, 54–55, 59
immunophenotyping in. See under *Immunophenotyping.*
acute lymphocytic, APAAP method in, 228
acute myeloid, APAAP method in, 228–229
adult T-cell, HTLV-I and, 69–70, 72–75
autoimmune disease and, 376–379
chronic lymphocytic, B cells in, activation of, 165–166
cytogenetics of, 168
cytoskeleton abnormalities of, 164–165
development of, 163–164

Leukemia *(Continued)*
chronic lymphocytic, differentiation capacity of, 166–168
membrane abnormalities of, 164–165
proliferation of, 165–166
immunobiology of, **163–195**
natural killer cells in, 171–172
T cells in, 168–169
T helper cells in, 170
T suppressor cells in, 170–171
chronic lymphoid, APAAP method in, 228
chronic myelogenous, immunoglobulin gene rearrangements in, 55
in blastic transformation, APAAP method in, 229–230
gene rearrangements in, 35–36
lineage assignment in, 53–56
methodology for, 53
minimal residual disease detection with, 59
hairy-cell, **179–195**
cytochemical features of, 183–184
diagnosis of, APAAP method in, 228
discovery of, 179
disorders mimicking, 188–189
immunoglobulin gene rearrangements in, 56
immunology of, 184–185
malignancies associated with, 183
morphologic features of, 180–183
in bone marrow, 181
in liver, 182
in lymph nodes, 182
in peripheral blood, 180
in spleen, 181–182
"normal" counterpart to, 185–186
rule-out of, cytochemistry in, 220–221
therapy of, 189–190
"variant," 186–188
vascular disorders in, 183
HTLV-II and, 85–87
lymphoid blast crisis in, immunoglobulin gene rearrangements in, 55
lymphoid versus nonlymphoid, cytochemistry in, 219
lysozymuria in, 500
mixed, gene rearrangements in, 55–56
phenotyping in, 125
mixed myeloid/lymphoid, APAAP method in, 230
myeloid, phenotyping in, 124–126
phenotyping in, 124–126
T-cell, **119–134**
acute lymphoblastic, clinical features of, 126–127
diagnosis of, 119–120
genetic markers in, 123
monoclonal antibodies in, 120–123
prognosis of, 126–127
treatment of, 128–131
versus lymphoblastic lymphoma, 124
adult, 145–146
of post-thymic differentiation, **135–150**
prolymphocytic, 140
T-knobby chronic lymphocytic, 140
uric acid/creatinine ratio in, 500
Leukocyte esterase method, in urinalysis, 595–597
Leukocyte migration inhibition assay, in hearing loss, 394
Leukopenia, in hairy-cell leukemia, 180
Light scattering, in flow cytometry of urine, 543
Linear diode array optics, in automated instrumentation, 625–626
Liver, autoimmune disease of, **281–301**
chronic active hepatitis, anti-SLA antibody-positive, 290–291
antigen-specific suppressor T-cell defect in, 283
classical autoimmune-type "lupoid," 285–286
cytotoxicity test systems in, 284–285
etiology of, 282–283
HLA antigens and, 362
immunosuppressive therapy in, 282–283
liver-kidney-microsomal antibody-positive, 286–288
smooth muscle antibody-positive, 291–292
primary biliary cirrhosis, 292–295
tests for, 295–296
types of, 281–282
Liver-kidney-microsomal antibody-positive chronic active hepatitis, 286–289
Long-acting thyroid stimulator (LATS), 304
LSA_{12}-L_{12} protocol, in acute lymphoblastic leukemia therapy, 129–131
in acute lymphoblastic lymphoma therapy, 130–131
Lumac Biocounter microbiology analyzer, 645
"Lupoid" chronic active hepatitis, 285–286
Lymph nodes, architecture of, evaluation of, 213
T-cell neoplasms of, of post-thymic differentiation, 140–146
Lymphadenopathy, angioimmunoblastic, 141–142
immunoblastic, 141–142
autoimmunity and, 374
surface markers in, 240–241
Lymphadenopathy-associated virus. See *Human immunodeficiency virus.*
Lymphocyte proliferation assay, in hearing loss, 394
Lymphocytes. See also *B cells; T cells.*
activation of, in schizophrenia, 255–257

in inflammatory bowel disease, 331
in urinalysis, 488
flow cytometry in, 545–547
Lymphocytic surface markers, in lymphoid leukemoid reactions, **237–245**
Lymphocytoma, surface markers in, 241
Lymphocytosis, polyclonal, 239
surface markers in, 237–239, 242
Lymphocytotoxic autoantibodies, in transplantation, 369–370
Lymphoepithelioid cell lymphoma, 142–144
Lymphoid leukemoid reactions, lymphocytic surface markers in, **237–245**
Lymphoid malignancy, autoimmune phenomena in, **373–398**
hematologic, 375–378
interferon therapy and, 381–382
systemic, 378–382
Lymphoid neoplasia, biclonal, immunoglobulin gene rearrangements in, 57–59
Lymphoid papulosis, 137, 139
gene rearrangements in, 35
Lymphoid pseudotumor, cytochemistry in, 216
Lymphoma, acute lymphoblastic, treatment of, 130–131
Burkitt's, 111–112
chromosomal translocations in, 39
cytochemistry in, 213–214
in extranodal disease, 216
in histiocytic form, 216
in testicular mass, 216
rule-out of, 214
with limited biopsy material, 218
extranodal, cytochemistry in, 216
gene rearrangements in, 35–36
chromosomal translocation in, 59–60
clonality assessment in, 57–59
lineage assessment in, 53–54, 56–57
methodology for, 53
histiocytic, cytochemistry in, 216
HTLV-I-related, 145–146
in immune deficiency disorders, 108–109, 111–112
lymphoblastic, 123–124
lymphoepithelioid cell, 142–144
non-Hodgkin's, APAAP method in, 230–233
immunoglobulin gene rearrangements in, 56
peripheral, of post-thymic differentiation, 140–146
phenotyping in, 124–126
rule-out of, cytochemistry in, 214
T-cell, **119–134**
adult, 145–146
angiocentric, 144–145
angioimmunoblastic lymphadenopathy-like, 141–142
cutaneous, 136–139
Hodgkin's-like, 146
lymphomatoid granulomatosis-like, 144–145
multilobated, 146
of post-thymic differentiation, **135–150**
testicular, cytochemistry in, 216
well-differentiated, versus hairy-cell leukemia, 188–189
Lymphoplasia, surface markers in, 241–242
Lymphoproliferative disorders. See also *B cells, neoplasms of; Leukemia; Lymphoma; T cells, neoplasms of.*
APAAP method in, **223–236**
classification of, **1–252**
cytochemistry in, **211–222**
diagnosis of, **1–252**
Epstein-Barr virus and, **97–118**
HTLV–1 infection, **65–84**
HTLV-II infection, **85–95**
lymphoid leukemoid reactions and, lymphocytic surface markers in, **237–245**
molecular biology of, **1–252**
Lymphosarcoma, autoimmune disease and, 379
Lysozyme, in HIV infection, 273
in renal function assessment, 513–515
in urinalysis, in renal function assessment, 500

McKenzie bioassay of LATS activity, 304
Macroscopic examination, in urinalysis, 438–440
Malignancy. See also *Cancer*; *Leukemia*; *Lymphoid malignancy*; *Lymphoma.*
flow cytometry of urine in, 547–551
microscopic hematuria in, 607–608
Mean platelet volume, determination of, 666
Meniere's disease, autoimmunity and, 393
MENTOR knowledge-based system, 719
Methimazole, thyrotropin receptor antibody levels and, 317
Micro Coder microbiology analyzer, 645
Micro-U blood typing instrument, 680
Microalbuminuria, urinalysis in, **611–616**
MicroBank blood typing instrument, 680
Microbiology, history of, 646–647
rapid methods for, **643–651**
agglutination assays, 649
direct immunofluorescence assay, 648
enzyme immunoassay, 648–649
immunoperoxidase staining, 649–650
nucleic acid probes, 647–648
radioimmunoassay, 648
systems for, 644–646
β2Microglobulin, in HIV infection, 273
MicroGroupamatic blood typing instrument, 680
Microprocessors. See also *Computers.*
in automated instrumentation, 623–624

Microscopic hematuria, **601–610**
Microscopy. See also *Transmission electron microscopy.*
in urinalysis, 442–446
automated, 455–456
in hematuria, 601–603
nuclear magnetic resonance in, 750
Microtear blood typing instruments, 679
Microtiter plate technology, in microbiology, 649–650
MIRA analyzer, in STAT analysis, 693
Mitogenic activity, in schizophrenia, 257–258
Monoclonal antibodies. See also *Immunophenotyping.*
in hairy-cell leukemia, 184–185
in T-cell acute lymphoblastic leukemia, 120–123
in urinary sediment evaluation, **483–491**, 515–522
non-Hodgkin's lymphoma, 230–233
Monoclonal antibody markers, of T cells, 1–5
Monocytes, in urinalysis, 488
Mononucleosis, chronic, 112–113
infectious, 103–106
in hereditary immunodeficiency, 108–109
Multiple myeloma, chromosomal abnormalities in, 197
diagnosis of, 199–209
Bence-Jones protein in, 208
bone marrow criteria in, 202–206
subcutaneous nodules in, 207
indolent, 208–209
plasma cell accumulation in, 197–198
staging in, 207–208
therapy for, 209
Multiple sclerosis, HLA antigens and, 363, 368
Myasthenia gravis, HLA antigens and, 363–364, 369
Mycosis fungoides, 136
gene rearrangements in, 35–36
surface markers in, 241–242
Myeloid bodies, in urinary sediment, 469–476
Myositis, lymphoid malignancy and, 380

Natural killer cells, in chronic lymphocytic leukemia, 171–172
in inflammatory bowel disease, 332
Necrotizing vasculitis, in HIV infection, 274–275
lymphoid malignancy and, 380
Neoplasms, lymphocytic. See *B cells, neoplasms of*; *Leukemia*; *Lymphoid malignancy*; *Lymphoma*; *T cells, neoplasms of.*
Neopterin, urinary, in HIV infection, 273
Nephritis, acute interstitial, eosinophiluria in, 555–556, 562–564
urinalysis in, by monoclonal antibody technique, 490
transmission electron microscopy in, 477, 479
Nephropathy, Balkan, urinalysis in, 511
diabetic, microalbuminuria in, **611–616**
Nephrotoxicity, urinalysis in, eosinophiluria in, 555–556, 562–564
from aminoglycosides, 509, 511–512, 518
transmission electron microscopy in, 468, 476–477
from chemotherapeutic agents, 509, 518
from cyclosporine, 511–512, 518–521
from occupational exposures, 509–510
Neuritis, HLA antigens and, experimental allergic, 366–367
optic, 364
Neurologic disease, HLA antigens and, 363–364
in HIV infection, 275–276
Neutropenia, autoimmune, lymphoid malignancy and, 377–378
in hairy-cell leukemia, 180
Non-Hodgkin's lymphoma, pleomorphic, cytochemistry in, 214–215
NOVA Stat Profile analyzers, 694–695
Nuclear magnetic resonance, **737–751**
applications of, 748–750
in microscopy, 748
metabolites detected by, 749–750
relaxation times in, 745–747
sensitivity of, 746–747
theory of, 740–748
chemical shifts in, 742–744
free induction decay in, 744
spin-spin splitting in, 744
toxicology uses of, 748–750
Nucleic acid probes, in microbiology, 647–648

Occult blood, in urine. See *Hematuria, microscopic.*
Occupational exposures, kidney damage from, urinalysis in, 509–510
Odor of urine, in urinalysis, 438–439
Oliguria, in renal function assessment, 494
Olympus blood typing instruments, 678
Oncology, flow cytometry of urine in, 547–551
Oncornaviruses, 66–67
Operations management, in urinalysis, 586–587
Ophthalmologic disease, HLA antigens and, 364
Optic neuritis, HLA antigens and, 364

Optical systems, in automated instrumentation, 624–626. See also *Image analysis.*
Optimization of testing, robotics role in, 709
Organ transplantation, autoantibodies confused with anti-HLA antibodies in, 369–370
Orthostatic proteinuria, clinical significance of, 536
in renal function assessment, 500–501
Osmolality, in urinalysis, 439–440
in renal function assessment, 494–496
Otitis media, immune response in, 386–387
Otoarthritis, 389
Otologic disease, autoimmunity and, **385–398**
ear immunology in, 385–388
otosclerosis, 393
sensorineural hearing loss, 391–393
systemic disorders causing, 388–391
tests for, 394–395
vestibular dysfunction, 393
Otosclerosis, autoimmunity and, 393

Paramax chemistry analyzer, 640–641
Pathology, anatomic, image analysis in, 734–735
D-Penicillamine-induced proteinuria, HLA antigens and, 366
Perkin-Elmer robot, 702
Pernicious anemia, HLA antigens and, 362–363
Peroxidase indicators, in hematology analyzers, 667
Phoenix analyzer, in STAT analysis, 695
Phycobiliproteins, in flow cytometry of urine, 545
Pipetting, automated, 700–701
Plasma cells, formation of, 25
in inflammatory bowel disease, 329–330
in multiple myeloma, 198
Plasmacytosis, cytochemistry in, 220
Plasmapheresis, in immune complex disease, 346
Platelet distribution width, measurement of, 667
Platelet Monitor System, 685–686
Platelets, antibodies to, in HIV infection, 272
Polyarteritis nodosa, otologic involvement in, 390
Polychondritis, relapsing, otologic involvement in, 391
Polyglandular failure, HLA antigens and, 364
Polymerase chain reaction, in leukemia, 59
Polymyositis, HLA antigens and, 358
in HIV infection, 275
lymphoid malignancy and, 374
Polyneuropathy, demyelinating, in HIV infection, 276
Polyuria, in renal function assessment, 494
Postural proteinuria, clinical significance of, 536
PowerChart knowledge-based system, in recordkeeping, 719
Pre-B cells, formation of, gene deletion in, 20–21
in hematopoietic tissue, 16–17
intraclonal diversity in, 20
isotype switching in, 20–21
lymphoid stem cell gene rearrangements in, 19–20
identification of, with immunofluorescence, 18
with membrane protein study, 18–19
membrane proteins in, 18–19
Pregnancy, asymptomatic bacteriuria in, 569
thyrotropin receptor antibody levels in, 318
Preservation, of urine specimen, 435–436
Primary biliary cirrhosis, 292–295
HLA antigens and, 362
Procainamide therapy, lymphocytotoxic autoantibodies and, 369–370
Profilers, sample-based, in STAT analysis, 695–696
ProGroup blood typing instrument, 680
Propylthiouracil, thyrotropin receptor antibody levels and, 317
Prostaglandins, in inflammatory bowel disease, 330–331
Protein content, in flow cytometry of urine, 543
Protein/creatinine ratio, in urinalysis, in renal function assessment, 500–501
Protein mapping by electrophoresis, image analysis in, 732–734
Proteinuria, **527–540**. See also *Microalbuminuria.*
clinical significance of, 535–537
drug-induced, HLA antigens and, 366
evaluation of, 537
glomerular, 529–532, 536
mechanisms of, 528–533
glomerular, 529–532
in increased plasma protein concentration, 532–533
tubular, 532
normal levels of, 527–528
orthostatic, clinical significance of, 536
in renal function assessment, 500–501
overload-type, clinical significance of, 536
persistent, 536–537
protein composition in, 527–528
transient, 535–536
tubular, clinical significance of, 536–537
mechanisms of, 532
urinalysis in, 533–535, 537

Pure red-cell aplasia, lymphoid malignancy and, 377–378
Purpura, thrombocytopenic, HLA antigens and, 363
Pyelonephritis, urinalysis in, 518
by low-molecular-weight protein analysis, 512
localization of infection by, 571–573

Quality assurance, in robotic operations, 707–708
in urinalysis, **431–447**
Quantum microbiology analyzer, 646

Radioimmunoassay, in liver-kidney-microsomal autoantibody determination, 287
in microbiology, 648
in soluble cytoplasmic liver antigen autoantibody detection, 290–291
Random access analyzers, 634–635, 638–641
in STAT analysis, 696–697
"Random access fluid," in carryover elimination, 629
Rapimat II instrument, in urinalysis, 455
Rat brush border membrane antigens, in inflammatory bowel disease, 328–329
Reagents, dry versus liquid, in automated systems, 626–627
handling of, in automated instruments, 627–631
limitations of, 773–774
inventory monitoring of, 630
Recordkeeping, in urinalysis, report form for, 445–446
request form for, 431–432
knowledge-based systems in, 719
Red blood cells, antibodies to, in HIV infection, 272–273
in urine. See *Hematuria*.
Red-cell aplasia, lymphoid malignancy and, 377–378
Red cell distribution width, measurement of, 665–666
Refractometer, in urinalysis, 439
Reiter's syndrome, HLA antigens and, 365
Rejection, in renal transplantation, urinalysis in, 477, 509, 518–521
Relapsing polychondritis, otologic involvement in, 391
Relative DNA index, in flow cytometry of urine, 548
Relaxation therapy, immune system effects of, 263–264
Renal failure index, in renal function assessment, 498
Report form, in urinalysis, 445–446
Request form, for urinalysis, 431–432
Restriction fragment length polymorphism, autoimmune disease and, 367–368
Retinol binding protein, in renal function assessment, 513
Rheumatoid arthritis, HLA antigens and, 364–365, 368–369
lymphoid malignancy and, 379
otologic involvement in, 389
stress effects on, 259
Rheumatoid factor, idiotypic manipulation of, 403–404
in HIV infection, 272
lymphoid malignancy and, 379
RNA content determination, in flow cytometry of urine, 543
Robotics, **699–711**
accreditation of laboratory and, 707–708
advantages of, 699–700
as alternative to satellite laboratory, 706–707
assay optimization by, 709
computer-to-computer communications in, 705
definition of, 699
FDA approval of, 708
implementation of, 704
kinematics applied to, 700
laboratory director and, 710
medical technologists and, 708–709
personnel requirements for, 709
power requirements for, 704
practical applications of, 705–707
programming in, 703
quality control of, 707–708
software design for, 704–705
types of, 700–703
Routine analysis, automation of. See under *Automation*.

Safety precautions, in urinalysis, 436–437
Salmonella infection, arthritis after, HLA antigens and, 365
Sample-based profilers, in STAT analysis, 695–696
Samples. See *Specimen collection*; *Specimen handling, automated*.
Schizophrenia, as autoimmune disease, 254–259
antibrain antibodies in, 254–255
associated autoimmune diseases and, 254
cell-mediated antibrain immune reactivity in, 258
evaluation criteria for, 254
HLA antigens in, 258–259
interleukin-2 production in, 257
lymphocyte activation in, 255–257
mitogenic stimulation in, 257–258

Screen Machine blood typing instrument, 680–681
Sediment evaluation, in urinalysis, 442–446
in eosinophiluria, 559–560
in microscopic hematuria, 601–603
monoclonal antibodies in, **483–491**
transmission electron microscopy in, **463–481**
Semen analysis, automated, 729–731
Sensorineural hearing loss, autoimmunity and, 391–393
Septichek microbiology analyzer, 646
Sézary's syndrome, 136
gene rearrangements in, 35
Shigella infection, arthritis after. HLA antigens and, 365
Sjögren's syndrome, HLA antigens and, 358
in HIV infection, 274
lymphoid malignancy and, 379
otologic involvement in, 389–390
Skin, disease of, HLA antigens and, 359
lymphocytic infiltration of, surface markers in, 241–242
T-cell neoplasms of, of post-thymic differentiation, 136–139
Slide, microscopic, in urinalysis, 444
Smooth muscle antibodies, in chronic active hepatitis, 286, 291–292
Sodium, in urinalysis, in renal function assessment, 496–498
Solid state fluidics system, for liquid handling, 628
Soluble cytoplasmic liver antigen autoantibodies, in chronic active hepatitis, 290–291
Sorenson blood salvage system, 684
Southern blot analysis, of B cells, 22–23
Specific gravity, in urinalysis, 439
automated, 452, 454
in renal function assessment, 494–495
Specimen collection, for urinalysis, 432–436. See also specific method.
containers for, 434
eight-hour specimen, 433
for monoclonal antibody test, 484–485
in microalbuminuria, 614–615
midstream catch, 434
preservation methods for, 435–436
random, 433
storage and transportation in, 434–435
Specimen handling, automated, 627–631
Specimen identification, 630
Spectrophotometers, in automated instrumentation, 624–626
Spectroscopy, in urinalysis, 593
nuclear magnetic resonance. See *Nuclear magnetic resonance.*
Sperm analysis, automated, 729–731
Spleen, T-cell neoplasms of, of post-thymic differentiation, 139–140
Splenectomy, in hairy-cell leukemia, 189
Stains, in urinalysis, 444–445
in eosinophiluria, 557–564
Standardized urinalysis. See *Urinalysis, standardized program for.*
STAT analyses, automated, **689–697**
in dedicated location, 692
instruments for
selection of, 690–691
types of, 692–697
laboratory design and, 691–692
principles of, 689–692
rapid centrifugation in, 692
requirements of, in workflow analysis, 756
test selection strategies for, 689–690
transport systems for, 692
Stat Profile analyzers, in STAT analysis, 694–695
StatSpin centrifuge, 692
Sterile Connection Device, 686
Stress, interaction of, with immune system, 259–265
Subtraction densitometry, liver-kidney-microsomal autoantibody determination by, 287
Surface markers, in lymphoid leukemoid reactions, **237–245**
bone marrow abnormalities, 242
lymphadenopathy, 240–241
lymphocytosis, 237–239
reactive lymphoid hyperplasia, 240–241
skin infiltrates, 241–242
Synchron analyzers, in STAT analysis, 694
Syringe pump, for liquid handling, 628
Sysmex hematology analyzers, 657
Systemic lupus erythematosus, antibody production in, 346
HLA antigens and, 357–358
hydralazine-induced, HLA antigens and, 366
idiotypic manipulation in, 403–404
lymphoid malignancy and, 373–374, 379–380
otologic involvement in, 389
Syva Company blood typing instrument, 681

"T-cell disease," clinical features of, 126–127
T-cell-mediated regulation, of antibody production, in autoimmune disease, **337–349**
T-cell receptors, function of, 6–7, 32–33
gene rearrangements in, 36–39
acute lymphoblastic leukemia, 157–158
structure of, 32–33
T cells, activation of, by antibodies, 5
antibodies reactive with, 4–5
differentiation of, **1–14**
in chronic lymphocytic leukemia, 168–169

T cells *(Continued)*
interactions of, in thymic microenvironment, 7–8
monoclonal antibody markers of, **1–14**
neoplasms of. See also *Leukemia*; *Lymphoma*.
chromosomal translocations in, 39
gene rearrangements in, **31–44**
genotyping of, 34
immunophenotyping of, 34
of post-thymic differentiation, **135–150**
phenotyping in, 124–126
versus normal cells, 10–12
transformation of, by HTLV-I and II, 90–91, 93
versus malignant cells, 10–12
T-gamma cells, proliferative disorder of, 139
T helper cells, in chronic lymphocytic leukemia, 170
T suppressor cells, in chronic lymphocytic leukemia, 170–171
in inflammatory bowel disease, 331
in schizophrenia, 256–257
Tablets, in urinalysis, 591–593
Tamm-Horsfall protein, in urine, 528
Tartrate-resistant acid phosphatase activity, in hairy-cell leukemia, 183–184
in HTLV-II infection, 85–86
Technicon blood typing instruments, 676–677
Technicon hematology analyzers, 657–663
Terminal deoxynucleotidyl transferase, in bone marrow lymphoproliferative disorders, 242
in leukemia phenotyping, 125
Testicular mass, cytochemistry in, 216
Thrombocytopenia, in HIV infection, 275
lymphoid malignancy and, 375–377
Thrombocytopenic purpura, HLA antigens and, 363
Thymic microenvironment, ontogeny of, 8–10
T-cell interactions in, 7–8
Thyroid stimulating hormone binding inhibition assay, in Graves' disease, 308–311
Thyroiditis, Hashimoto's, HLA antigens and, 361
Thyrotropin receptor protein autoantibodies, tests for, **303–323**
clinical significance of, 317–318
diagnostic sensitivity in, 313–316
history of, 304–305
immunoglobulin heterogeneity in, 312–313
in pregnancy, 318
in vitro bioassay, 305–308
technical considerations in, 311–312
TSH binding inhibition assay, 308–311
Toa hematology analyzer, 657
Transfusion services. See *Blood banking, automated.*
Transmission electron microscopy, in urinary sediment evaluation, **463–481**
in acute interstitial nephritis, 477–478
in acute tubular necrosis, 464–470
in aminoglycoside nephrotoxicity, 470–477
in glomerular disease, 477
in hepatorenal syndrome, 477
in renal transplant rejection, 477
specimen preparation in, 463–464
Transplantation, autoantibodies confused with anti-HLA antibodies in, 369–370
renal, urinalysis in, 509, 518–521
transmission electron microscopy in, 477
Tubular cells, in urinalysis, 488–490
Tubular proteinuria, clinical significance of, 536–537
mechanisms of, 532
Turbidimetric methods, in urinalysis, in proteinuria, 534

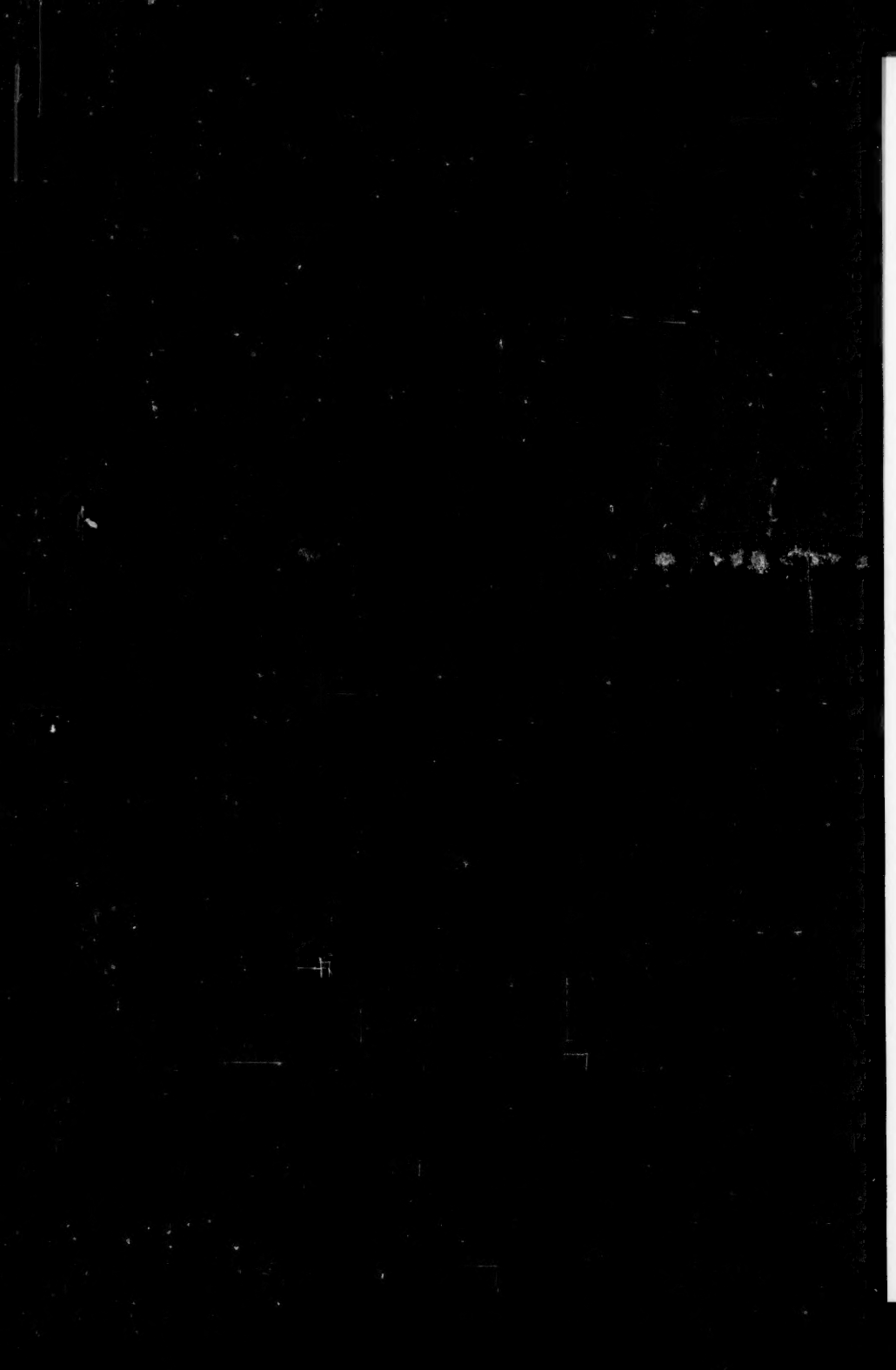
Ulcerative colitis. See also *Inflammatory bowel disease.*
otologic involvement in, 391
Urea nitrogen ratios, in renal function assessment, 496
Urethral syndrome, acute, urinalysis in, 570
Uric acid/creatinine ratio, in urinalysis, in renal function assessment, 500
Urinalysis, **415–622**
automation in, **449–461**, **585–599**
case study of, 595–597
history of, 593
image analysis in, 728–729
instruments for, 452–456, 728–729
Yellow IRIS system, 455–460
problems with, 449–451
progress in, 451–452
with dipsticks, 441
beta$_2$-microglobulin measurement in, 510–513
cellular casts in, 487–490
chemical evaluation in, 440–442
colorimetric methods in, in proteinuria, 534–535
cost accounting in, 587–589
dipstick testing in, 440–442, 592–593
automated, 454–455
in microscopic hematuria, 603
in proteinuria, 533–534
flow cytometry in, **541–553**
history of, **415–430**
ancient times, 415–416
early modern period, 426–427
Middle Ages, 416–420
nineteenth century, 428
Renaissance period, 420–426
since 1940, 591–593

immunologic methods in. See *Immunologic methods.*
immunoperoxidase staining in, 485–486
in acute renal failure, 508
in acute tubular necrosis, 517–518
in aminoglycoside nephrotoxicity, 509, 511–512, 518
in Balkan nephropathy, 511
in drug-induced nephrotoxicity, 509, 511–512, 518
in eosinophiluria, **555–564**
in heavy metal poisoning, 511
in hematuria, **577–584**
in kidney failure, 508
in microalbuminuria, **611–616**
in occupationally related nephrotoxicity, 509–510
in proteinuria, 533–535, 537
in renal diagnostic studies, **507–526**. See also specific disorder.
acute renal failure, 508
drug toxicity, 509
immunologic assays in, 515–522
low-molecular-weight protein measurement in, 510–513
occupationally related disorders, 509–510
renal enzyme measurement in, 513–515
renal transplantation rejection, 509
urinary tract infections, 508–509
in renal function assessment, **493–505**
N-acetyl-beta-D-glucosaminidase in, 501
adenosine deaminase-binding protein in, 501–502
beta$_2$-microglobulin in, 501
chloride levels in, 496–497
creatinine clearance in, 502
creatinine ratio in, 496
free water clearance in, 498–499
glomerular filtration rate in, 502
lactic dehydrogenase in, 499
lysozyme in, 500
orthostatic proteinuria in, 501
osmolality in, 494–495
renal failure index in, 498
sodium fractional excretion in, 497–498
sodium levels in, 496–497
specific gravity in, 494–495
transmission electron microscopy in, **463–481**
urea nitrogen ratios in, 496
uric acid/creatinine ratio in, 500
urinary protein/creatinine ratio in, 500–501
urine-to-plasma ratio in, 495–496
urine volume in, 494
in renal transplantation rejection, 509
in urinary tract infections. See *Urinary tract infections.*
infectious agent dangers in, 436–437
leukocyte esterase method in, 595–597
macroscopic examination in, 438–440
microscopic analysis in, 442–446
automated, 455–456
transmission electron microscopy in, **463–481**
nuclear magnetic resonance in, 748–750
quality assurance in, **431–447**
reflectance spectroscopy in, 593
request form for, 431–432
retinol binding protein in, 513
routine bacterial screening and, 568–569
safety precautions in, 436–437
sediment evaluation in, 442–446
automated, 450, 455–458
in eosinophiluria, 559–560
in microscopic hematuria, 601–603
monoclonal antibodies in, **483–491**
standardized program for, 442–446
transmission electron microscopy in, **463–481**
solid-phase chemistry in, 591–593
specimen collection for. See *Specimen collection.*
standardized program for, 437–446
chemical evaluation, 440–442
dipstick testing, 440–442
macroscopic examination in, 438–440
microscopic analysis in, 442–446
sediment evaluation, 442–446
transmission electron microscopy in, **463–481**
turbidimetric methods in, in proteinuria, 534
turnaround time improvement in, 593–597
work simplification in, **585–599**
case study of, 593–597
cost accounting in, 587–589
operations management in, 586–587
technologic innovations in, 589–593
working conditions for, 437
Urinary tract infections, eosinophiluria in, 561
in children, 568
in elderly patients, 568–569
in pregnancy, 569
localization of, 570–573
prevalence of, 568–569
urinalysis in, 508–509, 512, **567–576**
antibody-coated bacterial assay in, 572–573
as therapy guide, 573
in acute urethral syndrome, 570
in asymptomatic patients, 568–569
in infection site localization, 570–573
in symptomatic patients, 570
low-molecular-weight protein analysis in, 512
specimen collection in, 567–568

Urine-to-plasma ratios, in renal function assessment, 495–496
Urine volume, in renal function assessment, 494
Uroscopy. See also *Urinalysis*.
history of, **415–430**
Urothelial cells, in urinalysis, 490
Urotron RL9 instrument, in urinalysis, 455
USR–20 instrument, in urinalysis, 454
Uveitis, HLA antigens and, 364
stress effects on, 259

Vasculitis, in HIV infection, 274–275
lymphoid malignancy and, 380–381
otologic involvement in, 390–391
Vestibular dysfunction, autoimmunity and, 393
Visage electrophoresis system, 733–734
VISTA–7 instrument, in urinalysis, 454
VITEC AMS microbiology analyzer, 644
Vitiligo, HLA antigens and, 359

Water clearance, in urinalysis, in renal function assessment, 498–499
Wegener's granulomatosis, otologic involvement in, 390
White blood cell casts, in urinary tract infection, 571–572
Wiskott-Aldrich syndrome, Epstein-Barr virus and, 108–111
Workflow analysis, **753–758**. See also *Urinalysis, work simplification in*.
components of, 753
distribution of testing in, 754
routine testing in, 756–757
sample mapping in, 764–765
sample quality and type in, 755–756
specimen processing in, 770
STAT testing requirements in, 756
type of testing in, 755
volume of testing in, 754–755
workstation analysis in, 765
Wright's stain, for eosinophiluria analysis, 557, 560

Yellow IRIS instrument, in urinalysis, 455–460
Yersinia infection, arthritis after, HLA antigens and, 365

Zymate robot, 701–702, 706